Space Weather Forecast

Issued on Tuesday, 06 December 2022 at 01:11 Local

This forecast provides a four-day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Chance of Minor Geomagnetic Storm G1 midweek UTC.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been low over the past 24 hours, with occasional small common-class X-ray flares observed. These peaked at 05/0530UTC from a modest but growing magnetically bipolar sunspot in the central northern hemisphere. This was one of up to seven sunspot regions on the facing side of the Sun, with the disc dominated areally and in terms of nominal complexity by a large region in the southeast, although this group was quiet despite some growth in its intermediate spots. The remaining sunspots on the Sun were otherwise stable dipoles, perhaps joined into the UTC evening by a small unipolar region in the northeast, and perhaps also by still another in the far northeast by the period's end.

Starting around 05/1530UTC, a disturbance was noted across the southern end of a northeastern 'filament' near 20 East (an arc of plasma that can lift to become a Coronal Mass Ejection (CME)). At least some of these feature appears to remain in place in subsequent near infrared imagery, and it may be that it has failed to leave the immediate solar environment. A second nearby event occurred at 05/2130UTC, with a smaller filament to the immediate northwest of the first also appearing to lift off. For now there was no evidence of any Earth-bound Coronal Mass Ejections (CMEs) in available satellite imagery, but the aforementioned events are borne in mind.

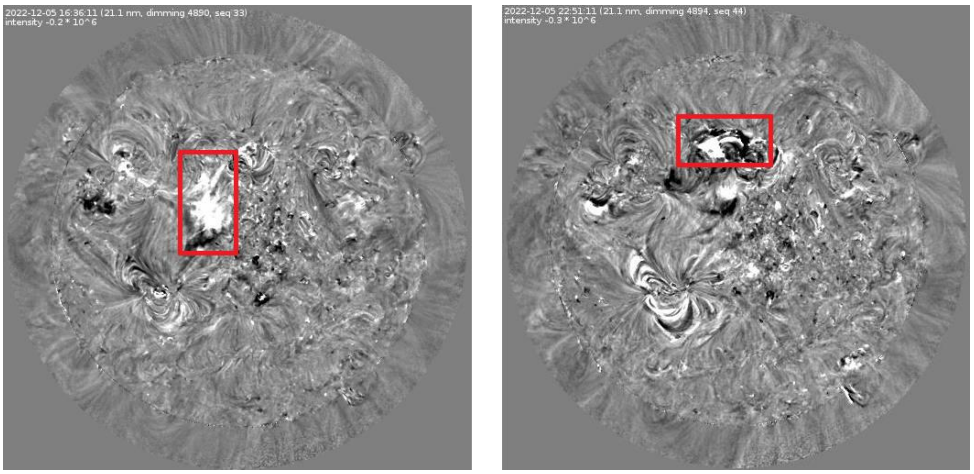

Figure 1: Time integrated extreme UV satellite imagery sequences of two potential 'filament lift-offs' in the period – respectively one peaking around 05/1530UTC and a second 05/2130UTC. Image processing courtesy of SIDC ROB.

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Perhaps also of note has been a semi-persistent very large 'prominence' (arc of plasma on the Sun's visual edge) in the southwest, although for the time being this remains anchored in place.

Solar Wind / Geomagnetic Activity: Solar winds were suggestive of a gradual exit from a recent fast wind.

The solar wind speed showed a gradual decline from Elevated to Slightly Elevated levels in the period. The number of particles in the solar wind showed a similar decline into typical background counts. The magnetic field tied to these particles was relatively constant and at Background levels throughout. Much of the 24-hour period was spent in anti-aligned territory with respect to Earth's field, although this lessened as the period drew to a close.

The net result of the above solar wind measures was provisionally quiet geomagnetic activity throughout.

Energetic Particles / Solar Radiation: No solar radiation storms were observed.

Four-Day Space Weather Forecast Summary

Solar Activity: There is a daily Chance of isolated moderate-class flares, perhaps most likely from the largest and hitherto most active sunspot regions, although the appearance of the current sunspots is not reflective of their observed flare activity. No significant regions arrive or depart in the four days.

Solar Wind / Geomagnetic Activity: No CMEs feature in the current forecast.

The incumbent fast wind has now long-since peaked, and a resumption of quiet geomagnetic activity is expected until the advent of a second fast wind on Wednesday 07 December. The driving feature is larger and more intense than last pass, and carries a chance of Minor Storm G1. Activity should then wane once again to quiet by the end of the current UTC working week.

Energetic Particles / Solar Radiation: No solar radiation storms are expected given the observed lack of even modest X-ray flares.

Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	1	30	20	1
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

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Radio Blackouts - X Ray Flares:

X Ray Flares	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability			(%)	(%)	(%)	(%)
Active	R1-R2 M Class	No	40	40	40	40
Very Active	R3 to R5 X	No	1	1	1	1

Solar Radiation Storms - (High Energy Protons):

Radiation Storms	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability (Exceedance)			(%)	(%)	(%)	(%)
Active	≥ S1	No	5	5	5	5
Very Active	≥ S3 *	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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